Location: QA Officer's Office
SOP Files
Wet Chemistry Laboratory

1.0 SCOPE

1.1 This SOP is applicable to drinking, surface, and saline water, domestic and industrial wastes, and acid rain (atmospheric deposition). Conductivity is run by EPA Method 120.1.

2.0 SUMMARY OF THE METHOD

2.1 This SOP is a procedure for evaluating Conductivity in liquid samples.
2.2 The specific conductance of a sample is measured by use of a self-contained conductivity meter.
2.3 Samples are preferably analyzed at 25°C.
2.4 Field measurements with comparable instruments are reliable.

3.0 INTERFERENCES

3.1 N/A

4.0 APPARATUS AND MATERIALS

4.1 Hach Conductivity/TDS Meter
4.2 1 L Volumetric flask
4.3 Plastic 50 mL Centrifuge tubes
4.4 Clean plastic cup
4.5 Pipette
4.6 Graduated Cylinder
4.7 Analytical Balance, 0.03 g – 100 g capacity

5.0 REAGENTS

5.1 Deionized (DI) water
5.2 Sodium Chloride (NaCl)
5.3 ERA Standard (2nd Source), see Certified Reference Material for preparation and concentration

6.0 SAMPLE HANDLING AND PRESERVATION

6.1 Conductivity is best analyzed as soon as possible from the time the sample is collected. Maximum holding time for water samples is 14 days when refrigerated at $4^{o}C \pm 2^{o}C$.
6.2 Samples must be provided in unpreserved, clear plastic bottles.
6.3 Analyses can be preformed either in the field or laboratory.

7.0 PROCEDURE

7.1 PREPARATION OF STANDARD SOLUTIONS, PREPARED FRESH EVERY 2 MONTHS

7.1.1 For a 180-µmhos/cm standard, dissolve 0.0214 g NaCl in 250 mL of DI water. The 180-µmhos/cm standard is used for blank spike.
7.1.2 For a 1,990-µmhos/cm standard, dissolve 0.25 g NaCl in 250 mL of DI water. The 1,990-µmhos/cm standard is used for Laboratory Control Sample (LCS).

7.2 MEASUREMENT

7.2.1 Turn on meter and place probe in a plastic cup filled with DI water.
7.2.2 For a blank, pour 10 mL DI water in a centrifuge tube.
7.2.3 Rinse off probe then place in tube. Make sure to eliminate all air bubbles around the tube. Press the 2 key for the most sensitive reading possible.
7.2.4 Place probe back in cup containing clean DI water.
7.2.5 Pour 10 mL of Blank Spike into centrifuge tube and read conductivity by following Section 7.2.3. Rinse off probe between each sample.
7.2.6 Pour 10 mL of LCS into centrifuge tube and read conductivity by following Section 7.2.3. Rinse off probe between each sample.
7.2.7 Pour 10 mL of Control, ERA standard, into centrifuge tube and read conductivity by following Section 7.2.3. Rinse off probe between each sample.
7.2.8 Pour 10 mL sample in another tube. Rinse off probe and place in this tube just as before. Adjust settings if the meter is reading too sensitively by pressing the 20 key.

If the meter still reads a value too high, press the 200 key. The meter gives values in µmhos/cm.

8.0 QUALITY CONTROL

8.1 See Table 1

8.2 Samples are analyzed in batches of twenty (20) or less per QC set. The QC samples that are analyzed per batch are:

- Control
- LCS
- Duplicate
- Method Blank
- Blank Spike

9.0 DOCUMENTATION

9.1 Conductivity Bench sheet

9.1.1 Analyst
9.1.2 Date Run
9.1.3 Method #
9.1.4 Detection Limit
9.1.5 Program #
9.1.6 Wavelength
9.1.7 Merit #
9.1.8 Dilution
9.1.9 Umhos/cm
9.1.10 ABS
9.1.11 %S
9.1.12 Result (umhos/cm)
9.1.13 Spike (umhos/cm)
9.1.14 % Recovery
9.1.15 Lot/ Source
9.1.16 Run Time

10.0METHOD PERFORMANCE

10.1 Precision and accuracy studies are performed on as needed basis. (Ex. new instrument, etc.)

Table 1. Quality Control Requirements (Sample Set = 20 samples)

QC Analysis	**Required/ Frequency**	**Limits**	**Corrective Action**	**Corrective Action after Reanalyzing**
Method (preparation) Blank	Yes One each set	1/10 Regulatory limit	Remove contamination and rerun	Notify client. Flag data.
Blank Spike	Yes One every 10 samples	90%-110%	Rerun	Notify client. Flag data.
Control	Yes One every 10 samples	90%-110%	Rerun	Notify client. Flag data.
Laboratory Control Sample (LCS)	Yes One each set	90%-110%	Rerun	Notify client. Flag data.
Matrix Duplicate	Yes One each set	RPD<20%	Rerun entire set	Notify client. Flag data.

11.0 REFERENCES

11.1 EPA Water NPDES, Method 120.1, EPA Test Methods, Revision 1982, Conductance (Specific Conductance, µmhos at 25°C).

12.0 SAFETY

12.1 Every Laboratory area has eyewash, emergency shower, and fire extinguisher. The metals lab also has dust masks available for use with dust samples.

12.2 The air system through out the laboratory area is on a 100% fresh air exchange system, this system exchanges 100% the air in the laboratory area with air from outside 6 times per hour and 30 times per hour when the emergency purge button is hit.

12.3 A reference file of material safety data sheets (MSDSs) is available to all personnel.

13.0 WASTE DISPOSAL AND POLLUTION PREVENTION

13.1 All laboratory waste must be managed, stored, and disposed in accordance with all federal and state laws and regulations.

13.2 Additional information can be found in the Sample Disposal SOP and Merit's Waste Management Plan and Handbook.

14.0 APPROVAL & ISSUE:

14.1 This section indicates which personnel have read, accepted and approved the SOP. All analysts involved with the SOP should acknowledge their comprehension of the SOP with a signature and a date.

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Analyst Date

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Andy Ball, QA Officer Date

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Maya V. Murshak, Technical Director Date